

Amendment to the Claims:

Please replace all previous versions of the claims with the following listing:

Please cancel claims 1-29 and add new claims 30-58 as follows:

30. (New) A method of using an engine driven power generating process as an integral part of a renewable energy system, wherein:

a compression ignition engine is used to generate either AC or DC electric current by alternately coupling a drive shaft of the engine, as and when appropriate, to either an AC electrical generator or a DC homopolar generator;

wherein DC electric current from the generating process is supplied to an electrolysis unit that converts water into hydrogen and oxygen;

wherein the compression ignition engine is fuelled by fuel that burns poorly in an engine;

wherein an enriched oxygen combustion atmosphere is provided in the engine so as to enable the fuel to be combusted more efficiently, and wherein the enriched oxygen atmosphere is formed by mixing oxygen produced by the water electrolysis unit with normal atmospheric air.

31. (New) The method as claimed in claim 30, wherein the hydrogen produced by the water electrolysis unit is packaged for use as a renewable gaseous transport fuel or as a reactant in fuel cells.

32. (New) The method as claimed in claim 30, wherein surplus oxygen from the water electrolysis unit is packaged for use as a reactant along with hydrogen in fuel cells.

33. (New) The method as claimed in claim 30, wherein the drive shaft of the engine is arranged so that it can be readily engaged with or disengaged from the AC generator or the DC generator, and in a manner whereby the engine is only coupled to one generator at a time.

34. (New) The method as claimed in claim 30, wherein the fuel is a renewable

non-fossil biofuel or a petroleum fuel oil.

35. (New) The method as claimed in claim 34, wherein the non-fossil biofuel is vegetable oil, animal fat, fish oil, or natural alcohol or mixtures thereof, or alternatively the non -fossil fuel is waste biofuel such as waste vegetable oil, waste fish oil, waste alcohol, or waste cooking oil or mixtures thereof.

36. (New) The method as claimed in claim 34, wherein the fossil petroleum fuel oil is heavy fuel oil, residual fuel oil, recovered fuel oil or waste based mineral oil.

37. (New) The method as claimed in claim 30, wherein AC electric current from the generating process is supplied locally.

38. (New) The method as claimed in claim 37, wherein the AC electric current supplied locally is generated by burning renewable non-fossil biofuel in the engine.

39. (New) The method as claimed in claim 30, wherein the DC electric current used to electrolyse water is generated by burning either non-fossil biofuel or fossil petroleum fuel oil in the engine.

40. (New) The method as claimed in claim 30, wherein the enriched oxygen atmosphere inside the engine contains between 2% and 6% extra oxygen, i.e. the combustion atmosphere has a composition of between 23% oxygen, 77% nitrogen and 27% oxygen, 73% nitrogen, depending on the specification of the fuel being burned in the engine.

41. (New) The method as claimed in claim 40, wherein the enriched oxygen combustion atmosphere inside the engine contains more than 6% oxygen.

42. (New) The method as claimed in claim 30, wherein waste heat in exhaust gas from the engine is recovered by raising steam in a steam boiler and using the steam to drive a steam turbine to produce more electricity.

43. (New) The method as claimed in claim 30, wherein the homopolar generator

comprises an electromagnetic coil to produce an annular toroidal magnetic field; means for positioning a conductive metal disc in the toroidal magnetic field so that the disc is intersected by both forward and return magnetic fields of the toroidal magnetic field; means for connecting the conductive disc to a drive shaft that is rotated by a compression ignition engine; and means for collecting the electric current generated in the disc when it is rotated through the toroidal magnetic field.

44. (New) The method as claimed in claim 30, wherein the current from the homopolar generator has a voltage of between 1 and 2 volts and a current density of 5000 amps/m² or more.

45. (New) The method as claimed in claim 30, wherein the drive shaft of the compression ignition engine drives a multiplicity of homopolar generators connected together either in series and/or in parallel.

46. (New) The method as claimed in claim 30, wherein direct current produced by the power generating process is connected by an electrical circuit to either a single water electrolysis unit or to a multiplicity of water electrolysis units connected together either in series and/or in parallel.

47. (New) The method as claimed in claim 30, wherein the water electrolysis unit consists of a large number of electrolysis cells typically containing a 25% solution of potassium hydroxide as an electrolyte, and wherein the electrolysis unit operates at a temperature of about 70°C and normal ambient atmospheric pressure.

48. (New) The method as claimed in claim 30, wherein renewable hydrogen fuel is generated by burning a renewable liquid fuel, such as vegetable oil, animal fat, fish oil or natural alcohol, in the enriched oxygen combustion atmosphere to generate electricity, and wherein direct electric current from the power generating process is supplied to the water electrolysis unit to produce the hydrogen.

49. (New) The method as claimed in claim 30, wherein renewable hydrogen fuel is generated by burning a fossil petroleum fuel oil, such as heavy oil, residual fuel oil or recovered fuel oil, in the enriched oxygen compression ignition engine to generate

electricity, and wherein direct electric current from the power generating process is supplied to a water electrolysis unit to produce the hydrogen.

50. (New) The method as claimed in claim 30, wherein exhaust gas from the engine is analysed for pollutants, and the exhaust gas is treated in dependence of the analysis so that pollutants are abated to acceptable environmental levels before the exhaust gas is released into the atmosphere.

51. (New) A homopolar electricity generating system comprising an electromagnetic coil to produce an annular toroidal magnetic field; a conductive metal disc positioned in the toroidal magnetic field such that the disc intersects both forward and return magnetic fields of the toroidal magnetic field; a drive shaft that is connected to the conductive disc and is rotated by a compression ignition engine; and means for collecting the electric current generated in the disc when it is rotated through the toroidal magnetic field.

52. (New) The homopolar electricity generating system as claimed in claim 51, wherein the engine can drive a multiplicity of homopolar generators that are connected together either in series and/or in parallel.

53. (New) The homopolar electricity generating system as claimed in claim 51, wherein electric current from the homopolar generator has a voltage of between 1 and 2 volts and a current density of 5000 amps/m² or more.

54. (New) A power generating system that can produce either AC or DC electric current comprising:

- a compression ignition engine;
- a supply of oxygen enriched air to a combustion chamber of the engine;
- a supply of poor burning fuel of fossil or non- fossil origin to the combustion chamber of the engine;
- an AC generator; and
- a homopolar electricity generating system having an electromagnetic coil to produce an annular toroidal magnetic field; a conductive metal disc positioned in the toroidal magnetic field such that the disc intersects both forward and return

magnetic fields of the toroidal magnetic field; a drive shaft that is connected to the conductive disc and is rotated by a compression ignition engine; and means for collecting the electric current generated in the disc when it is rotated through the toroidal magnetic field;

wherein the drive shaft of the engine is alternately coupled, as and when appropriate, to the AC generator or the DC homopolar generating system.

55. (New) The water electrolysis system comprising a power generating system as claimed in claim 54; a single electrolysis unit or a multiplicity of electrolysis units connected together in series and/or in parallel to electrolyse water into hydrogen and oxygen; and an electrical circuit to supply direct current from the power generating system to the electrolysis unit(s).

56. (New) The water electrolysis system as claimed in claim 55, wherein the water electrolysis unit is a low pressure, low temperature system that operates at about 70°C and normal ambient atmospheric pressure conditions, and wherein the water electrolysis unit comprises a large plurality of electrolysis cells each typically containing an electrolyte consisting of a 25% solution of potassium hydroxide.

57. (New) A hydrogen production system comprising the water electrolysis system as claimed in claim 55; and means for packaging the hydrogen produced by the water electrolysis unit so that the hydrogen is in a suitable form for use as a renewable gaseous fuel in transport applications or as a reactant in fuel cells.

58. (New) An oxygen production system comprising the water electrolysis system as claimed in claim 55; means for mixing oxygen produced by the electrolysis system with normal atmospheric air to provide the enriched oxygen combustion atmosphere for the engine; and means for packaging surplus oxygen for use, for example, as a reactant with hydrogen in fuel cells.